6. (Amended) An amorphous iron-based alloy having a composition consisting essentially of about 70-87 atom percent iron, up to about 20 atom percent of the iron being optionally replaced by cobalt and up to about 3 atom percent of the iron being optionally replaced by nickel, manganese, vanadium, titanium or molybdenum, the balance of elements present comprising a member selected from the group consisting of boron, silicon and carbon, said alloy being heat-treated in the presence of a magnetic field to induce a linear BH characteristic and low magnetic loss.

REMARKS

In order to more particularly point out and distinctly claim the subject matter regarded as the invention, claims 1 and 6 have been amended to delineate a formula for the amorphous iron-based alloy of the invention wherein up to about 20 atom percent of the iron may optionally be replaced by cobalt and up to about 3 atom percent of the iron may optionally be replaced by nickel, manganese, vanadium, titanium or molybdenum. Support for the amendment of claims 1 and 6 is found in the specification, e.g. at page 4, lines 19 – 23; page 8, lines 12 – 16; and Table I. Consequently, no new matter has been added.

The present invention provides a magnetic alloy having enhanced magnetic properties that render it particularly well suited for use in the magnetic cores of devices such as current/potential transformers. The combination of a linear BH loop characteristic over a wide range of applied field and low core losses allow construction of a core, which in turn provides a significant enhancement of the accuracy and reliability of a current/potential transformer. Such components are widely used for measurement of current and potential. Use of a current/potential transformer permits the

measurement circuitry to be electrically isolated from the actual circuit being measured, so that high voltage, high current measurements can be made safely and conveniently. For example, these measurements are essential for both metering and control of the electric power distribution grid. The present alloy represents a significant improvement for these essential capabilities.

Claims 1 – 10 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. In particular, the Examiner has indicated that the phrase "replaced by" in the independent claims (i.e., claims 1 and 6) is unclear. Applicants respectfully submit that the usage of the term "replaced by" is in accordance with common practice in the metallurgical arts. That is to say, the present alloy, as recited by amended claims 1 and 6, consists essentially of a metal content of 70 – 87 atom percent, which may be consist essentially of all iron. Optionally, up to 20 atom percent of the 70 – 87 atom percent metal may be cobalt, while the remaining at least 80 atom percent of the 70 – 87 atom percent metal is iron. As a result, the alloy of claims 1 and 6 having a total metal content of 70 atom percent contains iron ranging from about 56 to 70 atom percent and cobalt ranging from 0 to about 16 atom percent, all the atom percentages being taken on the entire elemental content of the alloy. Similarly, the alloy of claims 1 and 6 having a total metal content of 87 atom percent contains iron ranging from about 69.6 to 87 atom percent and cobalt ranging from 0 to about 17.4 atom percent.

The alloy of claims 1 and 6 optionally has further substitution of up to about 3 atom percent of nickel, manganese, vanadium, titanium or molybdenum (hereinafter referred to as the "T element") for iron. More specifically, the alloy of claims 1 and 6 having a total metal content of about 70 atom percent and the maximal replacement of iron by cobalt and the T element consists essentially of about 46.9 (= 67% of 70) atom percent iron, about 14 atom percent cobalt, and about

2.1 atom percent T, all the atom percentages being taken on the entire elemental content of the alloy. The alloy of claims 1 and 6 having a total metal content of about 87 atom percent and the maximal replacement of iron by cobalt and the T element consists essentially of about 58.3 (= 67% of 87) atom percent iron, about 17.4 atom percent cobalt, and about 2.6 atom percent T.

Applicants further maintain that the replacement of iron by cobalt and T is clearly disclosed as being optional, inasmuch as each of the examples disclosed at page 8, lines 12 – 16 and Table I is a commercially available Fe-B-Si or an Fe-B-Si-C alloy, wherein the iron content is not replaced by either Co or the T element.

In view of the amendment to claims 1 and 6 (and 2 – 5 and 7 – 10 dependent thereon, respectively) and the foregoing remarks, it is submitted that claims 1 – 10 meet the statutory requirement of 35 USC 112, second paragraph, by particularly pointing out and distinctly claiming, the subject matter regarded as the invention.

Accordingly, reconsideration of the rejection under 35 USC 112, second paragraph, of claims 1 – 10 as being indefinite is respectfully requested.

Claims 1 – 9 were rejected under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 USC 103(a) as obvious over US Patent 5,110,378 to Hasegawa et al.

Hasegawa et al. discloses a metallic glass having high permeability, low coercivity, low ac core loss, low exciting power, and high thermal stability. The alloy is said to be useful in fabricating magnetic cores suited for applications such as current/potential transformers that provide a linear output over a wide range of applied fields. Applicants maintain that the Hasegawa et al. reference does <u>not</u> disclose a magnetic alloy having a linear BH loop characteristic. As delineated by applicants at page 7, lines 20 – 23; and page 8, lines 1 – 2, a linear BH loop characteristic means a

linear magnetic permeability, over a wide range of applied field, e.g. an applied field ranging from about -15 Oe (-1200 A/m) to +15 Oe (+1200 A/m). By way of contrast, Hasegawa et al. does not disclose any material having a linear BH loop characteristic over a range of applied fields at all approaching the ±15 Oe range provided by the present alloy. Instead, the permeability values are said to be at least 40,000 and vary by no more than a factor of three for applied fields ranging from 0.4 to 10.0 A/m. Moreover, the lowest permeability disclosed by Hasegawa et al. is more than 19,000. One of ordinary skill in the art would recognize that such an alloy would not maintain a linear BH loop characteristic for an applied field ranging from about -15 Oe to +15 Oe, since the magnetic material would be substantially fully magnetically saturated at a saturating applied magnetic field much lower than 15 Oe. For applied fields stronger than the saturating field, the BH loop is saturated. Consequentially, permeability falls rapidly and the linear characteristic is no longer extant. As a result, it is submitted that Hasegawa et al. fails to disclose or suggest the alloy delineated by present claims 1 – 10. Any current/potential transformer constructed using magnetic alloy disclosed or suggested by Hasegawa et al. would fail to operate satisfactorily over the wide range of applied fields afforded by a transformer constructed using the alloy of present claims 1 – 10.

In view of the amendment to claims 1 and 6 and the foregoing remarks, it is submitted that the present alloy, as delineated by claims 1 – 10, is not disclosed or suggested by Hasegawa et al.

Accordingly, reconsideration of the rejection of claims 1 – 9 under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 USC 103(a) as obvious over US Patent 5,110,378 to Hasegawa et al., is respectfully requested.

The Examiner has cited US Patent 6,144,279 to Collins et al.; US Patent 5,871,593 to Fish et al.; US Patent 5,284,528 to Hasegawa et al.; US Patent 5,200,002 to Hilzinger; US Patent 4,812,181 to Hilzinger et al.; US Patent 4,473,413 to Nathasingh et al.; US Patent 4,409,041 to Datta et al.; US Patent 3,856,513 to Chen et al.; US Patent 6,018,296 to Herzer; and World Patent Publication WO-98/28639-A2 as being of interest and no more relevant to the claimed invention than the aforementioned Hasegawa et al. reference, but has not applied any of these disclosures. Clearly, the present invention, as delineated by amended claims 1 – 10, is not disclosed or suggested by any of these references.

For the reasons set forth above, it is submitted that the magnetic core-coil assembly delineated by amended claims 1 – 10 is patentable over the art applied, and that the present application is in allowable condition. Reconsideration of the rejection of present claims 1 – 10 and allowance of this application, are therefore earnestly solicited.

Respectfully submitted,

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